2. DESCRIPTION OF PROPOSAL AND ALTERNATIVES

2.1 INTRODUCTION

This chapter describes the proposed project and alternatives. It is also intended to address Issues 1 through 3 identified by Ecology. Those issues include: (1) an updated project description, (2) a description of the HDD pipe string launch plan, and (3) a description of Canadian project alternatives. The response to each issue is highlighted in the appropriate section of this chapter.

2.1.1 Background

GSX-US proposes to construct and operate a natural gas pipeline from the Canadian border near Sumas, Washington, to the United States-Canada border at Boundary Pass in the Strait of Georgia. At~~the~~ Boundary Pass ~~border~~, the pipeline would connect with its Canadian counterpart (GSX-Canada) and continue on to Vancouver Island, British Columbia. Both pipelines are a joint undertaking of Williams Gas Pipeline Company and BC Hydro.

The pipeline is a component of the proposed Vancouver Island Generation Project (VIGP), proposed by the Vancouver Island Energy Corporation (VIEC), a subsidiary of BC Hydro. VIEC proposes to construct a gas-fired power plant on Vancouver Island to supply the growing energy needs of island residents and businesses. That power plant would be supplied with gas from the GSX pipeline.

In March of 2003, VIEC applied to the British Columbia Utilities Commission (BCUC) for a Certificate of Public Convenience and Necessity to construct the VIGP. On September 8, 2003, the BCUC denied VIEC's application and recommended that BC Hydro proceed with a new analysis of alternatives to supply Vancouver Island's energy needs (BCUC 2003). In response to the BCUC ruling, BC Hydro issued a "Call For Tenders" (CFT) on October 31, 2003. Under that process, BC Hydro will accept and evaluate new proposals for energy generation and supply. An Independent Reviewer will evaluate the proposals and recommend a preferred option. At the time of publication of this Final SEIS, 23 bidders had registered. Some bidders are proposing new sources of power, whereas others would likely be interested in assuming control of VIGP's assets and completing a gas-fired plant similar to VIGP. This process is expected to be complete by the end of September 2004.

GSX-Canada shall confirm, prior to vegetation clearing, ground-breaking activities, or marine pipe laying operations, whichever comes first, that regulatory approvals for the VIGP have been obtained. GSX-Canada shall also file a letter with the Board from an officer of BC Hydro stating that the company intends to construct that facility and the date construction is scheduled to commence.

At this time, the effects of the ~~BCUC ruling on the GSX-US project are uncertain.~~NEB decision and BCUC process on the overall GSX pipeline are uncertain. However, they may result in delays to project permitting and construction.

2.1.2 Current Project Alternatives

As lead agency, the Department of Ecology recommended analysis of the following alternatives for this Supplemental EIS:

- **Proposed Action** – The proposed action is the Georgia Strait Crossing (GSX-US) project. The GSX-US pipeline is part of a larger project jointly sponsored by BC Hydro and Williams Gas Pipeline Company. The GSX project calls for the design, construction, and operation of two interconnecting natural gas pipelines, one in Canada and one in the U.S. The pipelines will transport natural gas from Sumas, Washington, to Vancouver Island, British Columbia. Because it is an international project, the GSX pipeline has a U.S. component (GSX-US) and a Canadian component (GSX-Canada).
- **Terasen Gas Alternative –** Under this alternative, TGVI would undertake phased expansion of its current natural gas distribution system serving Vancouver Island. The Terasen Gas Alternative includes construction of up to three new compression stations, pipeline looping ("twinning") of 45.3 miles of existing pipeline, and construction of a LNG facility with a storage capacity of 1 Bcf.
- **No Action Alternative** – Under the No Action Alternative, the GSX pipeline would not be constructed. Without the proposed pipeline, other projects may assist in reducing the demand for natural gas on Vancouver Island. An example is a proposal by NorskeCanada. NorskeCanada proposes to install new electrical power cogeneration facilities at three of its mills, in combination with energy conservation and demand management.

2.1.3 Alternatives Considered in the FERC Final EIS

The FERC Final EIS discussed several system alternatives to the GSX proposal. System alternatives differ from alternative pipeline routes in that they make use of existing, modified, or planned pipeline systems to meet the stated objectives of the proposed project. A system alternative could make construction of all or part of the proposed project unnecessary. However, some modifications to an existing system may be required to increase its capacity or, conversely, an entirely new system may need to be constructed. Those alternatives, discussed in Chapter 4.0 of the FERC Final EIS, are summarized below.

Centra System Alternatives

Centra (now TGVI) had proposed two system alternatives that were discussed in the FERC Final EIS. The first alternative would have expanded the existing Centra system without a new marine crossing. Features included two new compressor stations, the upgrade of a third compressor station, and approximately 161 miles of pipeline "looping."

The second alternative would have expanded the existing Centra system with a new marine crossing of the Strait of Georgia between Sechelt and Harmac. Additional features included two new compressor stations, an 18.6-mile marine crossing of the Strait of Georgia, a 0.8-mile marine crossing of Northumberland Channel, approximately 63 miles of onshore looped pipeline, and approximately 10 miles of new onshore pipeline.

BC Gas System Alternative

BC Gas (now Terasen Gas) currently operates a natural gas distribution system in southern British Columbia. However, it does not currently provide natural gas to Vancouver Island. TGVI, a wholly owned subsidiary of Terasen Gas, provides natural gas service to Vancouver Island. GSX-Canada evaluated the expansion of the BC Gas system as an alternative to the proposed GSX-Canada project (Singleton Associated Engineering, Ltd. 2002).

New facilities that would be required as part of the BC Gas system expansion include a new compressor station, 11.7 miles of new onshore pipeline, 25.6 miles of marine offshore pipeline across the Strait of Georgia, 1.5 miles of onshore pipeline across Valdes Island, 7.1 miles of offshore pipeline across Stuart Channel, and 6.3 miles of onshore pipeline on Vancouver Island.

ARCO System Alternative

The existing ARCO pipeline is 18 inches in diameter and transports natural gas from Sumas to industrial facilities near Cherry Point. This alternative would use the ARCO pipeline for much of the onshore route. However, the system would need to be extended to allow deliveries to Vancouver Island. Therefore, to provide equivalent volumes of natural gas, the ARCO system would require expansion and construction of new facilities similar to those proposed for the GSX-US project.

Cascade System Alternative

The existing Cascade pipeline is parallel to much of the GSX-US onshore route. The Cascade pipeline is part of an existing distribution (versus transmission) system. Therefore, the pipeline would require significant modification and/or expansion to accommodate volumes equivalent to the GSX-US proposal. Like the ARCO system alternative, the Cascade pipeline would need to be extended to allow deliveries to Vancouver Island.

Orca System Alternative

In April 2000, Westcoast, Cascade, and Puget Sound Energy announced plans to study and evaluate the development of the Orca pipeline to transport natural gas from Sumas to Port Townsend, Washington. Two routes were considered. The first route would run along I-5 to Everett and then cross Puget Sound. The second alternative would run through Whatcom County, and then mostly offshore through San Juan County to Port Townsend.

The Orca system was not designed to transport natural gas to Vancouver Island. However, its proponents claimed the project could be modified to accommodate the volumes and delivery points proposed by GSX-US. In order to serve Vancouver Island, the Orca project would be more than 200 miles long, compared to the entire 84-mile-long GSX project. In September 2000, Orca announced that the project was put on hold because of a lack of firm commitment from potential major customers.

2.2 PROPOSED GSX PIPELINE (ISSUE 1: UPDATED PROJECT DESCRIPTION)

The GSX project consists of two integral parts. The GSX-US portion of the pipeline would transport natural gas from existing pipeline systems at the United States-Canada border near Sumas, Washington, to an interconnection with the GSX-Canada pipeline at Boundary Pass in the Strait of Georgia. The GSX-Canada portion of the pipeline would extend 37.2 miles (27.5 miles offshore and 9.7 miles onshore) from its interconnection with the GSX-US pipeline at Boundary Pass to an interconnection with an existing pipeline operated by Terasen Gas on Vancouver Island south of Duncan.~~The GSX-Canada project was the focus of an Environmentaland Socio-Economic Assessment (ESEIA) that was part (Volume IV) of the application to the National Energy Board of Canada in April 2001.~~ The proposed route of the GSX pipeline is shown in Figure 2-1.

2.2.1 GSX-US

On April 24, 2001, GSX-US filed an application with FERC to construct, install, own, operate, and maintain a new interstate natural gas pipeline and ancillary facilities in the state of Washington. GSX-US's proposed facilities were described in detail in Section 2.0 of FERC's EIS. On October 11, 2001, GSX-US amended its application to FERC to include several minor changes. That amendment included an adjustment of the location of the Cherry Point compressor station and three pipeline route variations—I-5 variation, Percie Road variation, and the Trillium variation. Those changes were examined as alternatives to the original proposed project and were described in detail in Sections 4.4 and 4.6 of the FERC EIS. GSX-US's proposed project (as amended on October 11, 2001) was approved in the FERC's Order issuing a Certificate of Public Convenience and Necessity on September 20, 2002.

Pipeline Facilities

The GSX-US proposal calls for a pipeline to transport natural gas from existing pipeline systems at the United States-Canada border near Sumas, Washington, to an interconnection with a pipeline proposed by GSX-Canada at Boundary Pass in the Strait of Georgia. The system would consist of 47.3 miles of 20- and 16-inch-diameter pipeline.

The onshore portion of the pipeline would connect to the existing Westcoast and Northwest Pipeline systems at the international border at Sumas. From that point, a 20-inch-diameter pipeline would extend 32 miles to the Cherry Point compressor station. From the compressor station, a 16-inch pipeline would extend 1.1 miles to the beginning of the marine portion of the project at the Strait of Georgia shoreline.

The marine or offshore portion of the proposed route would be 13.9 miles long and constructed on a new right-of-way. The first 0.6 mile from the shoreline would be installed using the Horizontal Directional Drill (HDD) method to avoid disturbance of the shoreline in the Cherry Point State Aquatic Reserve. The next 4.8 miles of the pipeline would be installed in a trench so that the top of the pipe would be nearly level with the seafloor. The remaining 8.5 miles of the offshore portion of the pipeline would be laid directly on the seafloor.

Figure 2-1: GSX Pipeline Route

Aboveground Facilities

For the onshore portion of the pipeline, aboveground facilities would include an interconnection facility, a compressor station, and mainline valves. The Sumas interconnection facility would be adjacent to Northwest Pipeline's existing Sumas compressor station. The Cherry Point compressor station would occupy a 12-acre site on Jackson Road near the BP Cherry Point Refinery. Mainline valves and associated permanent access roads would be installed along the pipeline route and would be located within the permanent right-of-way.

Route Modifications

GSX-US is proposing two minor modifications to the pipeline route that were not originally reviewed and approved by the FERC. These modifications include:

Van Buren Road Reroute

A 4,125-foot-long segment of the original pipeline route deviated from the existing Cascade and ARCO Pipeline rights-of-way near the crossing of Johnson Creek and Van Buren Road at milepost (MP) 6.1. Located about 700 feet north of the Cascade Pipeline right-of-way, the original route was farther away from several residences, presented more favorable topography at the HDD exit, and provided shorter construction access across Johnson Creek to the HDD entry location than a route following the existing pipeline right-of-way.

Recent information gathered along the original route west of Van Buren Road indicates a natural spring is present at the HDD exit location that could be adversely affected. To avoid the spring, GSX-US considered lengthening the HDD to the west. However, the most suitable location for the HDD exit is near a nearby gravel pit. GSX-US determined that the likely success of the HDD would be reduced given the geological formation in this area. In order to cross Johnson Creek at a more favorable location, GSX-US is now proposing to continue the route along the Cascade and ARCO Pipeline rights-of-way. In addition to being fully collocated with existing pipeline rights-of-way and avoiding impacts on the spring, the proposed route variation would be more than 1,000 feet shorter than the originally proposed route.

Kickerville Road Reroute

The original pipeline route near MP 28.0 followed property lines and the existing ARCO pipeline right-of-way. Because of the presence of wetlands along the original route and current plans to develop the property as a wetland mitigation site, GSX-US is now proposing to deviate slightly from the ARCO right-of-way and to follow the Burlington Northern Railroad right-of-way. In addition to minimizing wetland impacts, the proposed route variation would be about 670 feet shorter than the originally proposed route. GSX-US currently owns the property that would be affected by the Kickerville Road reroute.

Project Construction (Issue 2: HDD Pipe String Launch Plan)

Section 2.3 of the FERC Final EIS contains a detailed description of the various construction methods that would be used to install the pipeline and related facilities. The HDD method would

be used for installing the pipeline beneath the Cherry Point State Aquatic Reserve. GSX-US would assemble the pipe for the HDD at a pipe string launch site along Gulf Road. The site totals 23.6 acres, of which 8.6 acres would be the 50-foot-wide Gulf Road right-of-way. During use of this site, one lane of roadway south of Henry Road would be left open for traffic. If activities require complete closure of the road for short periods of time, the closures would be scheduled so that minimal impact on traffic would occur. The site-specific plan for launching the HDD pipe string from the Gulf Road site is shown in Figure 2-2.

2.2.2 GSX-Canada

Background

In April 2001, Georgia Strait Crossing Pipeline Limited (GSX-Canada) submitted an application to the National Energy Board of Canada (NEB) for a Certificate of Public Convenience and Necessity to construct and operate the Canadian portion of the GSX project.~~Action by the NEB on the GSX-Canada project is pending.~~

The application to the NEB included an Environmental and Socio-Economic Assessment (ESEIA), which was prepared in accordance with the guidelines for filing requirements under Section 52 of the National Energy Board Act and the requirements of the Canadian Environmental Assessment Act. It examined the marine and terrestrial environmental settings and socioeconomic setting relevant to the pipeline project, identified the potential environmental and socioeconomic effects of the project, including cumulative effects, and assessed the significance and likelihood of any residual effects after implementation of mitigation measures (GSX-Canada 2001). The discussion of environmental impacts of the GSX-Canada project contained in this Supplemental EIS is drawn primarily from that document.

Pipeline Facilities

The Canadian portion of the GSX project consists of 27.5 miles of marine pipeline and 9.7 miles of onshore pipeline. The project would commence at a point on the international border at Boundary Pass, approximately midway between the east end of Saturna Island (BC) and the west end of Patos Island (Wash., U.S.). The ~~It~~marine portion of the pipeline would terminate at a point on the Vancouver Island shoreline just north of Manley Creek (Figure 2-1).

The onshore segment of the project would commence at the Manley Creek landfall on Vancouver Island and end at an interconnection with the existing TGVI pipeline near Shawnigan Lake. This portion of the project would consist of 9.7 miles of 16-inch-diameter pipeline. The proposed ~~GSX/Terasen~~GSX/TGVI interconnection would be adjacent to ~~Terasen Gas's~~TGVI's existing Shawnigan Lake meter station near the west end of Shawnigan Lake.

Figure 2-2: HDD Pipe String Launch Plan

2.3 TERASEN GAS ALTERNATIVE (ISSUE 3: CANADIAN PROJECT ALTERNATIVES)

2.3.1 Background

TGVI, formerly Centra Gas British Columbia, Inc., provides natural gas transmission and distribution services to more than 76,000 residential, commercial, and industrial customers on Vancouver Island and the Sunshine Coast. In response to VIEC's Application for a Certificate of Public Convenience and Necessity to build a new gas-fired generation facility on Vancouver Island that would be supplied by the GSX pipeline, TGVI developed a proposal for expansion of its current system through compression, pipeline looping, and addition of a liquefied natural gas storage facility. The proposal was submitted as evidence to the BCUC in May 2003 for a hearing on the VIEC proposal. In its proposal, TGVI contended that the proposed expansion of its facilities could defer or avoid the need for the GSX pipeline and be executed at a lower cost. TGVI requested the BCUC to direct BC Hydro to negotiate and enter into a long-term natural gas agreement with TGVI to serve the needs of Vancouver Island. At this writing, TGVI has not submitted an Application for a Certificate of Public Convenience and Necessity to implement its proposal.

2.3.2 Proposed Facilities

TGVI proposes a phased expansion program of upgrades to its system through compression and looping and the construction of an on-island LNG storage facility. The primary components of the program, shown in Figure 2-3, include:

- Expansion of the TGVI system through the addition of new compression facilities between 2005 and 2007.
- Looping of approximately ~~45.7~~45.3 miles of existing pipeline.
- Construction of an on-island 1 Bcf LNG storage facility with liquefaction and vaporization facilities to be in service as early as November 2007.

Compressor Stations

TGVI proposes the addition of up to three compressor stations alone or in conjunction with other facility additions: one station would be located upstream of the town of Squamish, one in Secret Cove on the Sunshine Coast, and the third at Dunsmuir on Vancouver Island. In addition, compression horsepower would be increased at TGVI's existing compressor ~~stations at Coquitlam and Texada Island.~~station at Coquitlam, with modifications to the Texada Island compressor station.

Pipeline Looping

Pipeline looping ("twinning") would be required on four segments of TGVI's existing pipeline. Those segments include:

- Watershed to Sky Pilot Creek (15.5 miles) is located on the mainland beginning where the existing pipeline emerges from the Greater Vancouver Water District watershed. This loop

would parallel the existing pipeline through the Hixon Creek, Brandt Creek, Indian River, and Stawamus River valleys.

- Sky Pilot Creek to Squamish (3.1 miles) begins where the existing pipeline exits the narrow Stawamus Valley and enters the wider Squamish Valley.
- Sky Pilot Creek to Woodfibre (10 miles) traverses the Squamish River Valley by passing through Squamish, crossing the Squamish River, and climbing over the western valley wall to Woodfibre.
- Texada Island (16.7 miles) commences at the landing of the Secret Cove Marine pipelines and gradually climbs northwest along the center of Texada Island to the Texada Island block valve approximately halfway up the island.

LNG Facility

The TGVI proposal includes a 1 Bcf LNG facility to be located on Vancouver Island. The LNG facility would be connected directly to TGVI's existing transmission pipeline system. Operation of a LNG facility involves liquefaction of natural gas during periods of low demand, typically in warmer weather periods (up to 200 days of the year), followed by delivery during periods of high demand, typically during colder winter weather.

After it is purified, clean gas is sent to a refrigeration unit where the gas is condensed to its liquid state for storage. After liquefaction, the LNG is stored in a double-shell, insulated tank. A 1 Bcf tank would be approximately 150 feet in diameter and reach a height of approximately 150 feet.

Requirements for the operational area depend on the capacity of the operational facilities and equipment, as well as the topography of the site. For a level site, the operational area for a 1 Bcf LNG storage tank and associated facilities would be approximately 10 acres. A buffer zone would surround the operational area and separate the facility from adjoining properties and related public activities. This ensures a high level of public safety, regardless of changes to land use outside the buffer zone. The size of the buffer zone, as prescribed by Canadian regulations, is directly related to the design and capacity of the LNG storage tank and the design of the secondary containment area. With the buffer included, a minimum of 300 acres would be required for the site.

TGVI has undertaken initial siting studies for the LNG facility on Vancouver Island. More information on those preliminary studies is contained in TGVI's evidence submitted to the BCUC (Terasen Gas 2003).

2.4 NO ACTION ALTERNATIVE (ISSUE 3: CANADIAN PROJECT ALTERNATIVES)

Under the No Action Alternative, the GSX project (GSX-US and GSX-Canada) would not be constructed. The FERC EIS on the GSX-US project included a general discussion of alternatives that could be implemented under this scenario including energy conservation; use of alternatives fuels such as oil, wood, or coal; solar power; wave energy; and upgrading existing electric transmission cables serving Vancouver Island (FERC 2002). Since publication of the FERC

Figure 2-3: Terasen Gas System Proposal

Final EIS, other alternatives have been proposed that could help reduce the demand for natural gas on Vancouver Island if the GSX project is not constructed. One of these is the NorskeCanada Energy Project.

2.4.1 NorskeCanada Energy Project

Background

Norske Skog Canada Limited (NorskeCanada) owns three integrated pulp and paper mills on Vancouver Island at Crofton, Campbell River, and Port Alberni. A fourth mill is located at Powell River on the British Columbia mainland. For some time, NorskeCanada has been interested in taking advantage of power generation opportunities at its mill sites. In late 2001, it approached BC Hydro to identify opportunities for working together on major projects. NorskeCanada was not able to reach agreement with BC Hydro on any major projects or to agree on the economic requirements for a successful project.

Following the government's referral of the VIGP to the BCUC, and BC Hydro's application to the BCUC in March 2003, NorskeCanada has been working to complete the necessary engineering and economic analyses to support a proposal it believes would reduce demand for natural gas and produce energy at a lower cost than VIGP.

Proposed Facilities

NorskeCanada proposes to install new electrical power cogeneration facilities at its three Vancouver Island pulp and paper mills, together with energy conservation and demand management projects. The NorskeCanada Energy Project, with a total winter power capacity of approximately 364 megawatts (MW), is intended to meet power demand growth from other Vancouver Island electricity consumers and compensate for BC Hydro's declining transmission capacity from the BC mainland to Vancouver Island.

The NorskeCanada project calls for power generation and power demand reduction projects at NorskeCanada's three pulp and paper mills on Vancouver Island (Figure 2-4):

- Crofton Pulp and Paper Mill located near Duncan
- Port Alberni Paper Mill located in Port Alberni
- Elk Falls Pulp and Paper Mill located north of Campbell River

The primary components of the NorskeCanada proposal are turbine cogeneration, heat recovery, and demand management.

<u>Gas and Steam Turbine Cogeneration</u>

The new power generation facilities proposed for installation at the mills would be a combination of gas turbine and steam turbine cogeneration facilities integrated with the mill utilities. Cogenerated steam is produced by recovering heat from the gas turbine exhaust, and would replace steam currently produced in gas-fired boilers. The gas, formerly used in the gas-fired boilers to generate steam, would be used to generate both steam and power, resulting in more

Figure 2-4: NorskeCanada Mill Sites

efficient use of the gas fuel. At the Crofton mill, a combination of gas and steam turbines would generate 107 MW. At Elk Falls, a combination of gas and steam turbines would generate 104 MW. At Port Alberni, a new gas turbine would generate 45 MW.

Heat Recovery

The second component of the NorskeCanada proposal would be a new thermomechanical pulp (TMP) facility to be installed at Elk Falls. TMP is a mechanical pulp produced by using large amounts of electrical energy in refiners that convert wood chips into pulp suitable for paper. The new TMP plant would result in reduced energy usage and increased steam production through an efficient heat recovery system. This steam would supplement the mill's existing steam system and allow for increased steam turbine power production.

Each TMP line would include a heat recovery system to collect steam from each of the refiners for reprocessing in a reboiler. The new lines would reduce the refining energy by 15 MW with no significant impact on pulp quality. The heat recovery systems would produce clean steam that could be used elsewhere in the mill. This will allow an additional 13 MW of power to be produced by the steam turbines in the mill. The combined net reduction of electrical power consumed by the TMP mill will be approximately 28 MW.

Demand Management

The new TMP facility would allow NorskeCanada to institute aggressive demand management. The increased TMP capacity would allow NorskeCanada to produce its daily requirement for tons of pulp by using periods of non-peak power demand on Vancouver Island and shutting down facilities during periods of peak power demand. Using this operating strategy, NorskeCanada would have the ability to free up significant power to the grid during peak power demand periods. For the purpose of this proposal, an operating scenario was developed that would allow transfer of 60 MW to the grid during peak demand periods. An additional 20 MW could be saved using load coordination among the three Vancouver Island mills.